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10/540,376	01/17/2006	Dirk Nuber	4791-4015	2736
27123	7590	06/02/2008	EXAMINER	
MORGAN & FINNEGAN, L.L.P. 3 WORLD FINANCIAL CENTER NEW YORK, NY 10281-2101			SHEVIN, MARK L	
			ART UNIT	PAPER NUMBER
			1793	
			NOTIFICATION DATE	DELIVERY MODE
			06/02/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOPatentCommunications@Morganfinnegan.com  
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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/540,376	NUBER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Mark L. Shevin	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 05 May 2008.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-38 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-38 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 22 June 2005 is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>05/12/2008 , 05/09/2008 , 06/22/2005</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application
	6) <input type="checkbox"/> Other: _____ .



## DETAILED ACTION

### ***Status***

1. Claims 1-38, filed in Applicant's election on May 5th, 2008, are pending.

### ***Priority***

2. Applicant's claim to benefit of German patent application DE 102 60 737.0, filed December 23<sup>rd</sup>, 2002, has been recorded

### ***Information Disclosure Statements***

3. The information disclosure statement (IDS) submitted June 22, 2005, May 8<sup>th</sup>, 2008 and May 12<sup>th</sup>, 2008 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement and has been considered by the examiner. Please refer to applicants' copy of the 1449 submitted herewith.

### ***Restriction Requirement***

4. The restriction requirement, mailed April 4<sup>th</sup>, 2008 has been withdrawn in view of Applicant's amendments to the claims in the response filed May 5<sup>th</sup>, 2008 in further defining the mechanism by which solids from the fluidized bed are entrained in the central gas stream.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 1 recites the broad recitation "introduced from below...", and the claim also recites "preferably central supply tube" which is the narrower statement of the range/limitation.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. **Claims 1, 2-30, 32-34, and 36-38** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Formanek** (AU 9894057 A) in view of **Hiltunen** (US 5,505,907) and any one of **Beisswenger** (US 4,817,563), **Reh** (US 4,080,437), or **Schmidt** (US 4,402,754)

Formanek

Formanek teaches a method for the heat treatment of solids containing titanium in which reduction of ilmenite is performed in a manner suitable for commercial plants and to operate as inexpensively as possible (p. 1, para 3). Ilmenite is reduced in stationary fluidized bed using a reducing fluidizing gas in a temperature range of 600 - 1000 °C and an H<sub>2</sub> + CO content of 80 – 100 vol% (p. 2, para 1).

Formanek does not teach a fluidized bed furnace with a central gas supply tube that is at least partly surrounded by a stationary annular fluidized bed where the gas flowing through the tube entrains solids from the fluidized bed nor the particle Froude numbers.

Hiltunen

Hiltunen, drawn to an apparatus for utilizing a hot gas flow (Title), teaches a reactor **10** with an annular chamber **12** provided with a fluidized bed **14**. A central gas inlet duct / conduit (gas supply tube) **16** surrounded by the stationary fluidized bed and the top edge (upper orifice) is even with the top surface of the fluidized bed **20** (col. 4, lines 1-6). The reactor functions by pushing particles as overflow over the inlet duct

edges **18** where the hot gas flowing through the inlet cools and correspondingly heats the solid particles (col. 4, lines 45-55).

Appropriate fluidizing is maintained by flowing fluidizing gas through nozzles **52** in to the annular chamber **12** and the volume of the solid particles in the reactor may be regulated by adding particles via conduit **54** or by discharging them via conduct **56**.

The upper surface of the bed **14**, may be arranged a higher level than the top level of the duct **16** and its edges **18** so that solid particles overflow **50** and are entrained in the hot gas supply (col. 6, lines 15-50), the advantage being less fouling and clogging of the inlet duct.

Beisswenger – Reh - Schmidt

These three references are all drawn to methods of operating fluidized beds, and teach that it is well known in the art to define the operating conditions of a fluidized bed by using Froude numbers (Beisswenger, col. 3, lines 20-45, Reh, col. 3, lines 5-30, Schmidt, col. 2 line 58 – col. 3, line 18.).

Regarding claim 1, it would have been obvious to one of ordinary skill in fluidized bed furnace design, at the time the invention was made, taking the disclosures of Formanek, Hiltunen and one of Beisswenger, Reh, or Schmidt as a whole, to incorporate the reactor design of Hiltunen and the particle Froude number control means of Beisswenger, Reh, or Schmidt into the titanium ore (ilmenite) reduction process of Formanek for at least the following reasons. One would be motivated to use the apparatus of Hiltunen as he taught that his particle overflow and gas entrainment method reduced fouling and improved heat exchange while one would be motivated to

use the particle Froude numbers of Beisswenger, Reh, and Schmidt as the three all taught the particle Froude numbers as well-known means of controlling fluidized beds and one would reasonably expect such control to ensure effective and gentle transport of solids in a reactor.

Regarding claims 2-4, Beisswenger, Reh, and Schmidt all teach the important of using particle Froude numbers and the instantly claimed ranges are not regarded as patentable distinctions in view of the tendency of one of ordinary skill to optimize reaction conditions in the course of routine experimentation as MPEP 2144.05 II(A) states: "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

Regarding claim 5, Hiltunen teaches that the upper surface of the fluidized bed **14**, may be arranged a higher level than the top level of the duct **16** and its edges **18** so that solid particles overflow **50** and are entrained in the hot gas supply (col. 6, lines 15-50),

Regarding claim 6, apertures on the shell surface do not represent a patentable distinction in that one of ordinary skill in the art would recognize from Hiltunen that apertures work to increase the effective area by which solid particles may overflow into the incoming hot gas stream of the inlet duct / conduit.

Regarding claim 7, Formanek teaches the reduction of ilmenite.

Regarding claim 8-11, Formanek teaches that a fluidizing gas containing at least 90 vol% hydrogen at a temperature of 600-1000 °C (p. 7, para 2) and it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the

instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). Furthermore, MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists." With respect to the water vapor and nitrogen contents, the hydrogen-containing gas of Formanek appears to be substantially similar to the claimed composition and accomplishes the same goal in reducing ilmenite and thus one of ordinary skill would reasonably expect it to have nominal water vapor and / or nitrogen contents.

Regarding claims 12-17, Formanek teaches that at least part of the exhaust gas from the second reactor, which is provided downstream of the first reactor, is introduced into the first reactor (p. 2, para 1) and from Hiltunen, one would be motivated to recycle such gas to recover the waste heat to further heat additional ilmenite ore. Formanek further teaches the iron metallization is approximately 85-98%, which is within the claimed ranges (p. 2, para 1). Cooling stages are provided downstage of the second reactor (p. 6, para 1) and cyclones are provided to separate solids from the exhaust gas and recirculated these solids to the reactor(s) (p. 11, para 2).

Regarding claim 18, the ilmenite is magnetically roasted (at least partially oxidized) (p. 7 para 2).

Regarding claims 19 and 20, fuel in the form of natural gas is supplied to the fluidized combustion chamber (p. 7, para 1). With respect to introducing the gaseous

fuel to both the fluidized bed and the gas supply tube, one of ordinary skill in reducing ilmenite, would seek to introduce fuel evenly to the ilmenite so that reduction and favorable chemical reaction would occur quickly.

Regarding claim 21, Formanek teaches gas may be re-heated (pre-heated) by two fired heaters **23a** and **23b** before it is reused in the first or second reactors (p. 8, para 2).

Regarding claims 22 and 25, Formanek suggests that ilmenite from the annular stationary fluidized bed is subjected to a cooling medium in downstage cooling chambers **2c** and **2d** and it separated by cyclone (p. 6, para 1 and 2).

Regarding claims 23 and 24, Formanek teaches that at least part of the exhaust gas is separated from solids in a downstream separator, supplied to a pre-heating stage equipped with a dryer and a separator (p. 4, para 1).

Regarding claims 26 and 27, one of ordinary skill would be motivated to spray water to cool the solids below 300 °C as Formanek teaches that the cooled ilmenite is withdrawn for further treatment and processing to obtain synthetic rutile and one would appreciate that this process will occur at lower temperatures and as one could choose from commonly use cooling media such as air and water to cool the ilmenite.

Regarding claim 28, the method of claim 1 that was rejected above included all these claimed features.

Regarding claim 29 and 30, Hiltunen discloses these features in Figures 1-3.

Regarding claims 32 and 33, Formanek suggests that ilmenite from the annular stationary fluidized bed is subjected to a cooling medium in downstage cooling

chambers **2c** and **2d** and it separated by cyclone (p. 6, para 1 and 2). Furthermore, the exhaust gas is re-processing downstream of the solids separator (p. 4, para 1). (See also the rejections for claims 19-27).

Regarding claim 34, Formanek teaches that at least part of the exhaust gas from the second reactor, which is provided downstream of the first reactor, is introduced into the first reactor (p. 2, para 1) and from Hiltunen, one would be motivated to recycle such gas to recover the waste heat to further heat additional ilmenite ore.

Regarding claim 36, Formanek teaches a pre-heating stage for the solids (p. 4, para 1 and para 2).

Regarding claims 37 and 38, Formanek teaches cooling stages are provided downstage of the second reactor (p. 6, para 1) and cyclones are provided to separate solids from the exhaust gas and recirculated these solids to the reactor(s) (p. 11, para 2).

7. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Formanek** in view of **Hiltunen** and any one of **Beisswenger, Reh, or Schmidt** as applied to claims 1, 2-30, 32-34, and 36-38 above, in further view of **Lapple** (US 3,578,798).

The disclosures of Formanek, Hiltunen, Beisswenger, Reh, and Schmidt, were discussed above, however none of these references specifically teaches a gas distributor which divides the chamber into an upper fluidized bed and lower combustion region.

Lapple

Lapple, drawn to a fluidized bed unit formed of single or multiple stages and combustion used to provide heat for reaction, teaches in Figure 1, a lower plenum **20** for admitting combustion air defined by plate **21** with perforated annular member **31** spaced above plate **22** to form the roof for chamber **30** (col. 2, lines 5-35). The lowermost chamber provides a plenum for admitting combustion air. A fluidized bed **33** is maintained in the space between **31** and the top **16** (col. 2, lines 35-45).

Regarding claim 31, it would have been obvious to one of ordinary skill in fluidized bed furnace design, at the time the invention was made, taking the disclosures of Formanek, Hiltunen, Lapple, and one of Beisswenger, Reh, or Schmidt as a whole, to incorporate the gas distributor plate design of Lapple that holds a fluidized bed above a combustion plenum, as Lapple teaches that his design drastically increases the solids-handling capacity of a fluidized bed (col. 1, lines 15-20).

8. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Formanek** in view of **Hiltunen** and any one of **Beisswenger, Reh, or Schmidt** as applied to claims 1, 2-30, 32-34, and 36-38 above, in further view of **Engstrom** (WO 90/11824)

The disclosures of Formanek, Hiltunen, Beisswenger, Reh, and Schmidt, were discussed above, however none of these references specifically teaches a supply conduit for fuel leading to a lance arrangement which opens out into the annular fluidized bed.

Engstrom

Engstrom, Drawn to a fluidized bed reactor with a protected fluid distributor, teaches that in large reactors it is especially difficult to achieve even distribution of fluid and/or particulate material throughout the whole cross sectional area of the reaction chamber and that this uneven distribution may cause significant problems (p. 2, lines 1-10).

The object of Engstrom's invention is to provide even distribution of fluid (which may be gaseous) in large reactors over the whole of the cross sectional area through reliable and easy-to-clean fluid inlet means (p. 5, lines 15-30.) Fluidized gas may be introduced through a standard gas distributor plate (p. 5 line 33 - p. 6, line 5) while fluid inlets are in the form of lances arranged to penetrate the side walls of the reactor and pass into the combustion chamber 2 and the fluid fuel used may be a gas (p. 10, lines 22-33). Figure 2 in particular shows a lance arrangement for injecting fuel.

Regarding claim 35, it would have been obvious to one of ordinary skill in fluidized bed furnace design, at the time the invention was made, taking the disclosures of Formanek, Hiltunen, Engstrom, and one of Beisswenger, Reh, or Schmidt as a whole, to incorporate the fuel lance arrangement of Engstrom into the fluidized bed reactor of Formanek et al, as Engstrom taught that such a lance arrangement allows uniform distribution of fuel and can thus avoid particle agglomeration and local overheating.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory

obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1-5 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-6 of pre-grant publication US 2006/0230879 (US 10/540,352). Although the conflicting claims are not identical, they are not patentably distinct from each other for the following reasons:

Regarding claims 1 and 5, US '879 discloses in claim 1, a method for the heat treatment of solids, in a temperature range that overlaps the claimed range, with identical particle Froude numbers. Claim 1 does not disclose that the "gas flowing through the gas supply tube entrains solids from the fluidized bed into the mixing chamber when passing through the upper orifice region of the gas supply tube", however claim 6 suggests this mechanism as the solids would be expected to overflow into the central gas supply tube. Thus it would have been obvious to one of ordinary skill in fluidized bed reactors to heat treat titanium-bearing ores with the method

disclosed by claims 1 and 6 of US '879 as this would only represent a simple substitution of sulfidic ores for solids bearing titanium, and one of ordinary skill would be motivated to substitute as the solids substitution would not be expected to change the nature of the fluidized bed process in that many types of solids (ore in particular) are linked by the need for heat treatment in the form of roasting or calcining.

Regarding claims 2-4, US '879 discloses identical particle Froude number ranges in claims 3-5.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

10. Claims 1-5 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 of pre-grant publication US 2006/0230880 (US 10/540,434). Although the conflicting claims are not identical, they are not patentably distinct from each other for the following reasons:

Regarding claims 1 and 5, US '880 discloses in claim 1, a method for the heat treatment of solids, in a temperature range that overlaps the claimed range, with identical particle Froude numbers. Claim 1 does not disclose that the "gas flowing through the gas supply tube entrains solids from the fluidized bed into the mixing chamber when passing through the upper orifice region of the gas supply tube", however claim 5 suggests this mechanism as the solids would be expected to overflow into the central gas supply tube. Thus it would have been obvious to one of ordinary skill in fluidized bed reactors to heat treat titanium-bearing ores with the method disclosed by claims 1 and 5 of US '880 as this would only represent a simple

substitution of “solids containing iron oxide” for solids bearing titanium, and one of ordinary skill would be motivated to substitute as the solids substitution would not be expected to change the nature of the fluidized bed process in that many types of solids (ore in particular) are linked by the need for heat treatment in the form of roasting or calcining.

Regarding claims 2-4, US ‘880 discloses identical particle Froude number ranges in claims 2-4.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

11. Claims 1-5 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 of pre-grant publication US 2007/0137435 (US 10/540,435). Although the conflicting claims are not identical, they are not patentably distinct from each other for the following reasons:

Regarding claims 1 and 5, US ‘435 discloses in claim 1, a method for the heat treatment of solids, in a temperature range that overlaps the claimed range, with identical particle Froude numbers. Claim 1 does not disclose that the “gas flowing through the gas supply tube entrains solids from the fluidized bed into the mixing chamber when passing through the upper orifice region of the gas supply tube”, however claim 5 suggests this mechanism as the solids would be expected to overflow into the central gas supply tube. Thus it would have been obvious to one of ordinary skill in fluidized bed reactors to heat treat titanium-bearing ores with the method disclosed by claims 1 and 5 of US ‘435 as this would only represent a simple

substitution of “solids containing iron oxide” for solids bearing titanium, and one of ordinary skill would be motivated to substitute as the solids substitution would not be expected to change the nature of the fluidized bed process in that many types of solids (ore in particular) are linked by the need for heat treatment in the form of roasting or calcining.

Regarding claims 2-4, US ‘435 discloses identical particle Froude number ranges in claims 2-4.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

**12.** Claims 1-5 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 of pre-grant publication US 2006/0231466 (US 10/540,436). Although the conflicting claims are not identical, they are not patentably distinct from each other for the following reasons:

Regarding claims 1 and 5, US ‘466 discloses in claim 1, a method for the heat treatment of solids, in a temperature range that overlaps the claimed range, with identical particle Froude numbers. Claim 1 does not disclose that the “gas flowing through the gas supply tube entrains solids from the fluidized bed into the mixing chamber when passing through the upper orifice region of the gas supply tube”, however claim 5 suggests this mechanism as the solids would be expected to overflow into the central gas supply tube. Thus it would have been obvious to one of ordinary skill in fluidized bed reactors to heat treat titanium-bearing ores with the method disclosed by claims 1 and 5 of US ‘466 as this would only represent a simple

substitution of “fine-grained solid” for solids bearing titanium, and one of ordinary skill would be motivated to substitute as the solids substitution would not be expected to change the nature of the fluidized bed process in that many types of solids (ore in particular) are linked by the need for heat treatment in the form of roasting or calcining.

Regarding claims 2-4, US '466 discloses identical particle Froude number ranges in claims 2-4.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

13. Claims 1-5 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 of pre-grant publication US 2006/0249100 (US 10/540,438). Although the conflicting claims are not identical, they are not patentably distinct from each other for the following reasons:

Regarding claims 1 and 5, US '100 discloses in claim 1, a method for the heat treatment of solids, in a temperature range that overlaps the claimed range, with identical particle Froude numbers. Claim 1 does not disclose that the “gas flowing through the gas supply tube entrains solids from the fluidized bed into the mixing chamber when passing through the upper orifice region of the gas supply tube”, however claim 5 suggests this mechanism as the solids would be expected to overflow into the central gas supply tube. Thus it would have been obvious to one of ordinary skill in fluidized bed reactors to heat treat titanium-bearing ores with the method disclosed by claims 1 and 5 of US '100 as this would only represent a simple substitution of “fine-grained solid” for solids bearing titanium, and one of ordinary skill

would be motivated to substitute as the solids substitution would not be expected to change the nature of the fluidized bed process in that many types of solids (ore in particular) are linked by the need for heat treatment in the form of roasting or calcining.

Regarding claims 2-4, US '100 discloses identical particle Froude number ranges in claims 2-4.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Conclusion***

-- **Claims 1-38 (All pending) are rejected**  
-- **No claims are allowed**

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**/Mark L. Shevin/**

**/Roy King/**

**Supervisory Patent Examiner, Art Unit 1793**

10-540,376  
May 22<sup>nd</sup>, 2008